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ABSTRACT

A relatively new area of psychological investigation is the identification of biographical and psychological variables which contribute to an individual's decision to move from or to stay in a geographical area. This study is an attempt to utilize biographical and psychological data on 50 college students in a multiple linear regression to predict a newly defined Mobility Index, which was derived from having subjects place themselves into groups according to mobility plans. Using the multiple linear regression (MLR) model, significantly better than chance prediction of Mobility Index was obtained from six biographical items, from three psychological scales, and from a combination of the psychological and biographical items. The variables investigated and the results obtained are summarized in tabular form. Using a hold-out cross validation sample (N=10), a cross validation R=.63 (RSQ=.40) was obtained. (Author)

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THE PREDICTION OF INDIVIDUAL MOBILITY PLANS[1]

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One of the behaviors which psychologists are just beginning to explore is the extent of geographic mobility which individuals demonstrate either as plans or actual movement to a different residence. Our interest has been in the prediction of planned geographic mobility from knowledge of several biographical and psychological measures. Planned mobility was selected as the independent measure, or criterion, because it appeared to be more free from environmental restrictions, such as inadequate finances, and therefore is intuitively closer to underlying personality dimensions.

This area of investigation has not been explored in any depth by psychologists. Several writers in the demography and mental health areas have presented conflicting results, in the analysis of incidence of mental illness and adjustment problems from areas of high and low mobility. The demographic approach to biographical variables has also produced conflicting results. Our review of the literature has not located any mobility studies dealing with actual measurement of personality constructs.

This presentation represents the first publication of our investigation of psychological variables which differentiate individuals with differing mobility plans. The data collection for our investigation was carried out during the 1972-1973 school year as part of a faculty grant to Dr. Koeppel,

the co-author of this paper. This publication represents only one aspect of the study and is itself an experiment with the use of a predictive model, the multiple linear regression equation, to analyze the results.

The method employed in this study was to administer two psychological instruments and an extensive biographical questionnaire to a number of undergraduate college students. Fifty college students were employed as subjects for this study, with an additional hold-out cross validation group of 10 students.

The questionnaire, in addition to eliciting a number of biographical and antecedent conditions, allowed the subjects to indicate their mobility plans. The four groups of mobility plans were: "I plan to continue living where I now live," "I plan to move from where I now live but stay within the state", "I plan to move out of the state", and "I am not a Mississippi resident and I plan to move out of the state." To establish that these groups reflect a continuum in terms of extent of mobility, these categories were submitted to ten independent observers who had no knowledge of the purpose of this study. All ten observers ranked the categories, with complete agreement between observers. These categorical mobility groups were combined to form a single continuous rank-ordered variable by assigning numbers from 0 to 3 to these groups, resulting in Mobility Index, the ordinally scaled variable which served as the criterion measure in this study.

The criterion and predictor variables used in this study are presented in table 1. Variables 1 through 3 were the 29 item Sensation-seeking Scale developed by Zuckerman et al. (1964) and the extraversion and neuroticism scales of the Eysenck Personality Inventory (Eysenck & Eysenck, 1968). The remaining 6 variables were biographical or antecedent

measures obtained from the questionnaire: the number of years the subject has lived in Mississippi, family size (computed from birth order information by adding number of brothers, sisters, and self), number of years the individual's family has lived in the state, the number of colleges and junior colleges the subject attended, the number of community and college organizations the subject reported belonging to, and the cumulative grade point average reported by the subject.

These variables were placed into a multiple linear regression equation with Mobility Index as the criterion. Analysis was carried out using Veldman's PROGRAM REGRAN. Table 2 presents the intercorrelations of all variables, with the zero order correlations between Mobility Index and the predictors shown to the right in the column headed variable 10. The exact probability of each of these correlations is shown in the last column. Conventional significance levels of .01 and .05 are also shown by the double and single asterisks.

The largest observed zero-order correlations were with variables 1 and 4, the sensation-seeking scale and years the subject had lived in the state, the latter being negatively related to future mobility.

Various multiple correlation-regression models tested are presented in table 3. This procedure is equivalent to step-wise regression analysis. The first column of table 3 shows the 8 different models employed beginning with the largest single predictor and adding predictors which add the most "accounted-for" variance to the equation. Column 2 shows the square of the multiple R, or the proportion of variance in Mobility Index which is accounted for by the equation. Using only one biographical predictor,

variable 4, 21% of the variance was accounted for; with the addition of variable 2 (Eysenck extraversion score) the multiple R squared was .32 suggesting that almost 1/3 of the variance could be accounted for.

Column 3 shows an F test of each model against chance, taking into account the changes in degrees of freedom due to the addition of predictor variables.

The last column shows the effect on the multiple R of adding additional predictors. The addition of variable 2 adds a significant amount of "accounted for" variance. Adding additional predictors beyond the second model did increase the multiple R, and R squared, but this step-wise addition of predictors did not add significant amounts of "accounted-for" variance. The optimal prediction was therefore obtained using one biographical and one psychological variable, the individual's past mobility and his extraversion score on the EPI.

Table 4, still using program REGRAN, presents tests of three models against chance: the full model with all variables (except variable 6 which was highly correlated with variable 4), a model using only psychological variables, and a model using only biographical data. This table shows the multiple R for each model. The last column on the table is a test of each model against chance. Each model accounts for a relatively large proportion of variance in Mobility Index and each model provides a significantly better than chance prediction.

Realizing that a multiple R based on only 50 subjects and 9 predictors capitalizes on chance occurance and is very questionable, these results were cross validated on a hold-out sample of 10 subjects. The cross

validation r=.63 was significant at the .05 level. Cross validation was carried out by hand using the b weights obtained in the regression equation with the full model. Correlation between the actual mobility index and the predicted mobility index on these 10 subjects provides evidence that the results obtained are not due to chance.

Several conclusions follow from this data:

1. There are psychological and biographical variables which correlated, alone and in multiple combination, with individual's planned mobility behavior. Planned mobility was related in this study to high optimal level of stimulation, extraversion, and past mobility. This conclusion, then, is that the psychologist has a place in the investigation of population mobility.

2. The other general conclusion is that analysis of multiple linear regression is a very useful statistical tool. Our experience was somewhat akin to the investigator faced with the simplistic logic of the mathematician "Oh, of course, the linear model. You know that's the basis of your tests like analysis of variance."

TABLE 1

VARIABLES INVESTIGATED

Variable Number	Description of Variable
1	Sensation Seeking Scale (SSS)
2	Eysenck Personality Inventory, Extroversion (EPI/E)
3	Eysenck Personality Inventory, Neuroticism (EPI/N)
4	Years individual has lived in Mississippi
5	Family size (number of brothers + number of sisters + 1)
6	Years individual's family has lived in Mississippi
7	Number of colleges and junior colleges attended
8	Number of organizations subject reports belonging to
9	Cumulative grade point average reported by individual
10	Mobility Index (The mobility index is computed for each subject by assigning an ordinal number from 0 to 3 to the mobility group in which the subject placed himself.)

TABLE 2

CORRELATIONS OBSERVED

VARIABLE	1	2	3	4	5	6	7	8	9	10		
MEANS	12.360	13.020	11.000	13.320	3.100	23.820	1.580	1.400	2.773	2.480		
S. D.	4.444	3.397	4.243	8.592	1.676	18.924	1.022	2.088	0.651	0.964		
R MAT											EXACT PROBABLITY(1)	
1	1.000	-0.032	-0.361	-0.356	-0.085	-0.390	-0.002	0.112	0.182	0.375	.0073	**
2		1.000	-0.014	-0.252	-0.039	-0.235	-0.044	0.199	-0.376	-0.204	.1508	
3			1.000	0.120	-0.008	0.015	-0.111	0.000	-0.181	-0.259	.0659	
4				1.000	-0.172	0.781	-0.128	-0.104	0.051	-0.460	.0011	**
5					1.000	0.037	0.165	-0.017	-0.093	0.255	.0706	
6						1.000	-0.042	-0.100	-0.053	-0.334	.0169	*
7							1.000	-0.109	0.234	0.245	.0824	
8								1.000	-0.154	-0.215	.1308	
9									1.000	0.297	.0342	*
10										1.000	1.0000	

(1) Exact Probablity is the probability that the correlation of the single predictor with the criterion (variable 10) occured by chance. For convenience, ** indicates p .01, * indicates p .05. Other simple order correlations not significant.

TABLE 3

MULTIPLE REGRESSION EQUATION

Predictors	Multiple R Square	Significance of Model Against Chance	Significance of Predictors Added to Equation
4	0.2119	.0011	--
4,2	0.3217	.0003	.0081 **
4,2,8	0.3631	.0002	ns
4,2,8,1	0.4044	.0002	ns
4,2,8,1,5	0.4355	.0002	ns
4,2,8,1,5,9	0.4629	.0002	ns
4,2,8,1,5,9,3	0.4750	.0003	ns
4,2,8,1,5,9,3,7	0.4826	.0004	ns

TABLE 4

TESTS OF SIGNIFICANCE

Description of Model	Predictors	Multiple R	R Squared	Level of Significance	
Full model, all predictors (Predictor 06 is omitted due to high intercorrelation with variable 04.)	01-05, 07-09	0.6992	0.4889	.0009	**
Psychological Tests	01-03	0.4436	0.1968	.0342	*
Biographical Data	04-05, 07-09	0.6361	0.4045	.0004	**